



US Army Corps of Engineers
Buffalo District



**Niagara Falls Storage Site (NFSS)
Formerly Utilized Sites Remedial Action Program
Public Workshop
June 24, 2009**



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Purpose of Meeting

- Open exchange of information
- Review of Remedial Investigation (RI) activities and path forward
- Present general scope for additional studies needed to complete the RI Addendum
- Discuss transition to the Feasibility Study (FS)
 - Operable Unit framework
 - Technical Memoranda

The purpose of today's meeting is several fold, but the most important objective is to allow for an open exchange of information and ideas regarding RI work at the NFSS.

We would like to start with an update of where we are in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) cleanup process and provide a quick summary of findings from the NFSS RI. Since the RI was completed in December 2007. Work toward site close out hasn't stopped. So tonight we would like to update you on current and planned RI Addendum activities and present the general scope for additional studies needed to fill data gaps and complete the RI Addendum based upon additional data needs and stakeholder input.

As we continue to work on the RI Addendum, we begin to turn our sights toward the Feasibility Study where we will develop cleanup standards and evaluate multiple remedial alternatives to address site contamination. A framework for the Feasibility Study has been developed that divides the site into distinct operable units. This approach was developed to allow for prioritization of the area of greatest potential concern, the Interim Waste Containment Structure (IWCS).

Finally, we will describe the use of Technical Memoranda and the process to be used to address key technical issues for the Feasibility Study and encourage public engagement during the early stages of the Feasibility Study process, rather than waiting for Feasibility Study completion.



Meeting Agenda

- Presentation (6:00 - 6:45 pm)
 - Status of the NFSS in the CERCLA* process
 - Completed and planned RI activities
 - Transition into FS phase of CERCLA
- Poster session (6:45 – 7:15 pm)
- Round table discussion (7:15 – 8:45 pm)

*Comprehensive Environmental Response, Compensation and Liability Act

Today's meeting is set up as a workshop to allow for more open exchange of information and stakeholder input. We encourage you to feel free to share your ideas and questions or concerns.

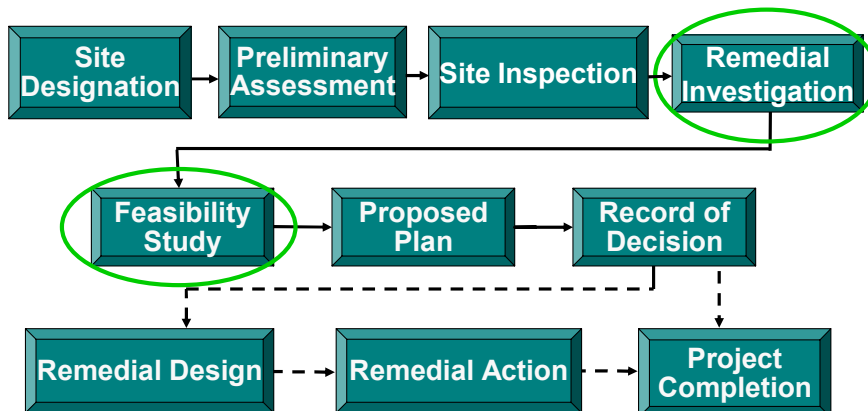
We will start with a brief slide presentation to cover:

- The status of the NFSS in the CERCLA process, including a quick review of findings from the RI
- Completed and planned activities needed to fill data gaps and complete the RI Addendum, and
- The transition into the Feasibility Study phase of CERCLA including:
 - the Operable Unit framework and
 - the Technical Memoranda Process to address key technical areas.

The slide presentation will go from 6:00 to 6:45 pm. Following the presentation we will invite you to come up and take a look at the posters we have prepared, which further explain the framework we propose to use for the Feasibility Study. The posters provide some site history as well as information on where the project is heading. While you are reviewing the posters, the NFSS project team will be available to respond directly to your questions or concerns. Following the poster session we will invite you to participate in a round table discussion of the information presented. Please hold your questions during the slide presentation but feel free to ask them during the poster session or during the 90 minute round table discussion.



Where the NFSS is in the CERCLA Process

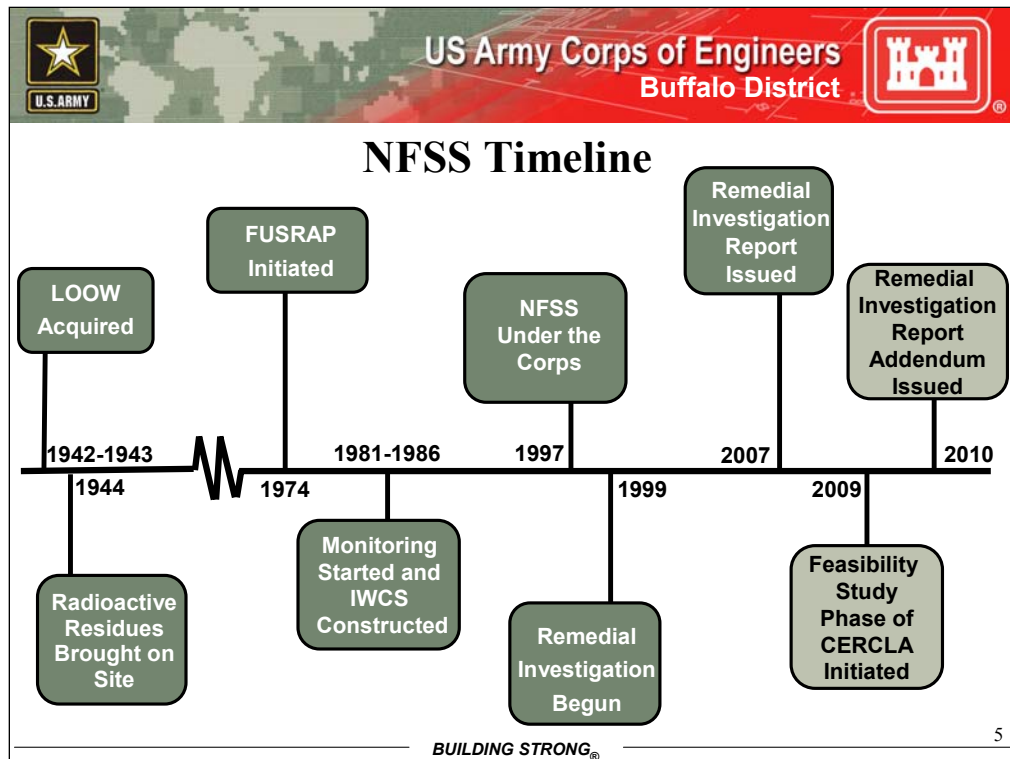


Actions at the NFSS are being performed under the Formerly Utilized Sites Remedial Action Program, or FUSRAP, which follows the CERCLA process for hazardous waste site cleanup. The CERCLA program lays out a systematic process for identifying, investigating and cleaning up hazardous waste sites. This graphic shows where we are in that process.

The purpose of the RI was to define the nature and extent of site contamination, and evaluate potential risks to human health and the environment. For the NFSS, the RI included a Baseline Risk Assessment to quantify potential risks to hypothetical receptors both on and off the property, and a groundwater model to quantify contaminant transport away from source areas.

The next step in the CERCLA process is the Feasibility Study. During the Feasibility Study, cleanup standards will be developed and multiple remedial alternatives to address site contamination will be evaluated.

The Feasibility Study leads to the Proposed Plan where the preferred remedial alternative is selected. Finally, a Record of Decision will be filed to document the final decision on site closure.



LOOW acquired: In 1942, the Corps acquired more than 7,000 acres of land in northwestern New York State and constructed a TNT production plant known as the Lake Ontario Ordnance Works or LOOW. TNT production at the LOOW ended a year later in July 1943.

Radioactive residues: In 1944 the Manhattan Engineer District (MED) was granted use of a portion of the LOOW (191-acres) for the storage of radioactive residues generated by uranium ore processing. With this action, the NFSS was created.

FUSRAP initiated: In 1974 the Formerly Utilized Sites Remedial Action Program (FUSRAP) was formed to address the legacy left behind by the Manhattan Engineer District/Atomic Energy Commission program, including the materials stored at the NFSS.

Monitoring started: Seven years later, in 1981, an environmental monitoring program was initiated to assess radon emissions from the NFSS and to look for radiological contaminants in surface water, sediment, and groundwater. Later that same year, radioactively contaminated soil from a vicinity property was excavated and placed in an area called the R-10 pile at the NFSS. Various remedial actions were performed throughout the 1980's, including construction of the IWCS from 1982 to 1986.

NFSS under Corps: In 1997, control of the NFSS was transferred from the Department of Energy back to the Corps. The Corps continued the environmental monitoring of the site and in February of 1999, the Corps issued the first scope of work directing the performance of the RI which was completed in 2007.

Current and future actions: Initiation of technical memoranda and Feasibility Study Work Plan in support of the Feasibility Study and the completion of an RI Addendum to fill identified data gaps.



Highlights of Completed CERCLA Activities at NFSS

- Completion of three phases of field investigations (1999-2003)
- Release of RI Report including the RI, Baseline Risk Assessment and Groundwater Flow and Contaminant Transport Modeling Reports (2007)
- Public information meetings (May and Sept. 2008)
- Review and response to comments from stakeholders on the RI in the form of a Responsiveness Summary

As we stated, the purpose of the RI was to determine the nature and extent of radioactive and chemical contamination at NFSS resulting from historic government operations and to evaluate potential risks to human health and the environment. Data collection for the RI started with a review of historic operational records and site-wide data collection. Results of the first investigative phases were used to focus subsequent investigations.

The RI Report included three principle elements, each with a different purpose:

- The RI** – presents historic process knowledge and analytical results to allow for delineation and quantification of site contamination in environmental media such as soil, surface water, sediment, and groundwater.
- The Baseline Risk Assessment** – quantified potential risk for current and future receptors at the site; the Baseline Risk Assessment quantified potential risk to human health and ecological receptors potentially exposed to chemical or radiological contamination.
- Groundwater Flow and Contaminant Transport Modeling** – the groundwater model was completed to predict the migration of contaminants from the NFSS. The model was used to predict contaminant migration under baseline (current) conditions and for three worst-case hypothetical scenarios.

Public information meetings to present the RI findings and to address some of your concerns regarding the RI were held in May and September last year.

In all, 334 comments were received regarding the RI, the Baseline Risk Assessment, and the Groundwater Flow and Contaminant Transport Modeling. Comments were submitted by local, state, and federal regulatory agencies, as well as from the community. While the Corps prepares responses to stakeholder comments on the RI, the list of comments has been posted to (<http://www.lrb.usace.army.mil/fusrap/nfss/nfss-ri-publiccomments-2009-05.pdf>) and a Responsiveness Summary is expected this fall. In the meantime, we used the comments where additional data collection was deemed necessary to scope the RI Addendum.



Conclusions from NFSS RI Report

- No immediate off-site risk to nearby communities
- No current off-site contaminant migration is occurring via surface water or sediments in drainage ditches
- Limited groundwater contamination
- The FS will examine a variety of options to address long-term risks presented by site contamination
- Environmental surveillance and maintenance activities will continue

The RI completed for the NFSS was extensive and included approximately 1,400 samples with over 150,000 analytical results. The RI showed no immediate risk to nearby communities.

Data collected for the RI shows no off-site contaminant migration via surface water or sediments.

At the NFSS, groundwater contamination is in the Upper Water Bearing Zone and sand lenses are discontinuous in extent.

The Feasibility Study will examine a variety of options to address long-term risks presented by site contamination.

The Environmental Surveillance Program and site maintenance activities, such as IWCS inspections, irrigation and other turf management activities, will continue.

In 2007 enhancements were made to the Environmental Surveillance Program such as increasing sample locations (e.g. the West Drainage Ditch) and increasing the parameters sampled. [<http://www.lrb.usace.army.mil/fusrap/nfss/nfss-fs-envsurvenhancements-2009-01.pdf>]



Current and Planned RI Activities

- Current RI activities
 - RI Data Gap Assessment

- Planned additional RI activities
 - Field effort
 - RI Addendum

After receiving the RI comments, the NFSS technical project team met to review draft responses to comments and to assess whether significant data gaps exist that would require additional investigation. Some of the data gaps identified will require additional field investigations while others will require additional review of historic records or the compilation of reference materials cited in the RI. The additional information collected to fill the identified data gaps will be presented in the RI Addendum.



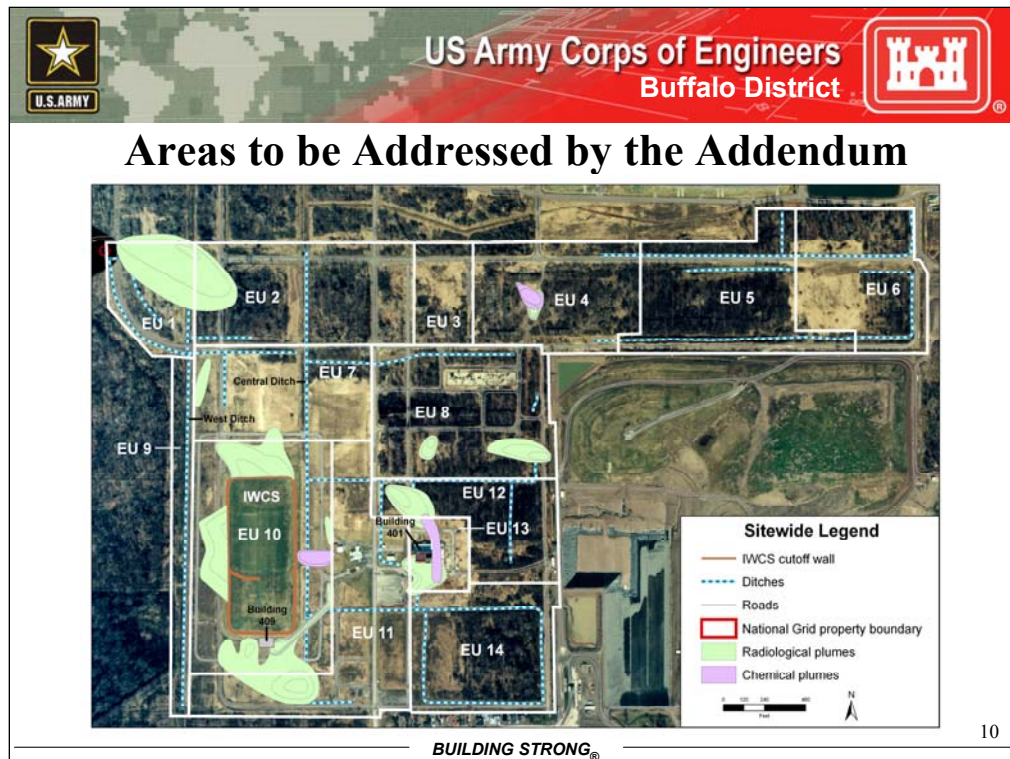
RI Addendum Topics

- Interim Waste Containment Structure (IWCS)
- Pipelines
- Building 409 area groundwater
- NFSS background values
- Potential off-site groundwater plumes
- Radiological sampling results
- Off-site surface water and sediment
- Historic operational areas
- Subsurface geology
- Supplemental RI information

Based on comments received on the RI and the Data Gap Assessment the following topics were identified for the RI Addendum:

- IWCS
- Pipelines
- Building 409 area groundwater
- NFSS background values
- Potential offsite groundwater plumes
- Radiological sampling results
- Off-site surface water and sediment
- Historic operational areas
- Subsurface geology, and
- Supplemental RI information

More detailed information for each of these topics is coming, but first we'd like to get you oriented as to where some of the key features are that will be investigated.



This graphic shows the location of some of areas identified for further investigation in the RI Addendum. Exact sample locations have not been proposed. However, we are here tonight to get your comments on the scope of the RI Addendum sampling.

- IWCS is the most prominent feature of the NFSS
- Pipelines are located across the site, additional investigation focused on radiological contamination, primarily in lines extending offsite
- We will be investigating radiological contamination of groundwater around the former Building 409 area located south of the IWCS
- Installation of additional wells to investigate potential offsite groundwater plumes near EUs 1, 4, 9 and 11
- Confirmatory sampling of surface water and sediment in West Drainage Ditch and Central Drainage Ditch as part of the Environmental Surveillance Program



RI Addendum Topics: IWCS

- Lake Ontario Ordnance Works (LOOW) Completion Report (J.G. White Engineering Corp., 1943)
- Details on IWCS construction
- Detailed IWCS inventory



The Corps has determined that, at this time, sufficient information exists regarding the IWCS contents and the short-term integrity of the structure, to begin evaluating alternatives in the Feasibility Study. In addition to the geotechnical information presented in the RI, the short-term integrity of the IWCS is continually monitored through the Environmental Surveillance Program and maintained under Operation and Maintenance. Assessment of remedial options for the IWCS potentially requiring intrusive sampling will be addressed after the Record of Decision. In the mean time, we will compile details on the IWCS construction and its inventory and include the LOOW Completion Report (White Engineering 1943) as supplemental RI information.

NOTE: The RI and Environmental Surveillance Program data speaks to the short-term viability of the IWCS as maintained and monitored. The geophysical survey of the IWCS indicates no short-term competency issues (i.e. cap settling, cutoff wall/dike failure, seismic vulnerabilities, etc.). Although there are limitations associated with non-intrusive survey methods, these limitations were minimized, to the extent possible, by utilizing a variety of geophysical survey methods. Non-intrusive means were used to assess the integrity of the IWCS in its current state in order to maintain the protectiveness of the cover with recognition of the potential risks to workers associated with intrusive sampling. If, after the Record of Decision, it is determined that additional information regarding the contents or performance of the IWCS is needed, appropriate steps will be taken to gather the needed information in the remedial design phase.

Intrusive sampling will not tell us the total volume of residues but it would allow for characterization of the material for the design of material handling systems should removal be the preferred alternative. Currently, assumptions regarding thorium/radium ratios in the K-65 residue are based on analytical results for K-65 residues removed from the facility in Fernald, Ohio. For the remaining residues it was conservatively assumed that thorium and radium were in equilibrium. This is a conservative assumption because over time thorium initially present in the residues will decay to form radium, thereby increasing the radium concentration. Because thorium decays radium presents the greatest risk and will be the limiting factor for disposal options.



RI Addendum Topics: Pipelines

- Document plugging of subsurface pipelines leaving the NFSS
- LOOW Completion Report (1943) – sections on LOOW underground lines
- Address radiological split samples collected during LOOW Underground Utilities RI
- Pipeline schedule for IWCS cutoff wall construction



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The RI Addendum will provide documentation that subsurface pipelines extending off the NFSS property have been plugged.

As already stated, the LOOW Completion Report (White Engineering 1943) will be provided as supplemental RI information. This report, which provides construction details for the LOOW, could also provide information relevant to the NFSS with respect to the location of pipelines.

As part of the investigations being completed for the LOOW, an Underground Utilities RI was completed. This report has been released to the public and is available at <http://www.lrb.usace.army.mil/derpfuds/loow/index.htm#Documents>. Although the LOOW investigation was primarily interested in chemical contaminants, several samples collected for this investigation were split and analyzed for radiological parameters. The radiological results from the split samples collected from offsite utility lines will be screened against background and risk limits and included in the RI Addendum.

Finally, for the IWCS vicinity, the pipeline engineering schedule that shows areas of the pipelines that were severed, filled, or removed will be provided as supplemental RI information along with backup construction photographs. This information will be used to locate the deepest pipeline/under-drain. The depth of the deepest pipeline will be compared to the depth of the clay cut-off wall.



RI Addendum Topics: Building 409 Area Groundwater

- Present building history
- Redraw uranium plume
 - Correct uranium value at temporary well point 833 (TWP833)
 - Remove data collected from manhole 06 (MH06)
 - Evaluate data from observation well 18B (OW18B)
 - Include recent data from Environmental Surveillance Program



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This slide shows the dissolved total uranium groundwater plume located southeast of former Building 409 which was presented in the RI Report. The areas shown in green exceed background levels. Since the RI Report was released, new information regarding the shape and extent of this plume has been reviewed and this information suggests that the configuration of this plume may be overly conservative. The RI Addendum will present a review of Building 409's history and a revised uranium groundwater plume map.

The Building 409 plume shown here was drawn using dissolved total uranium data from monitoring wells, temporary well points and manhole locations. The linear plume extending north and east was drawn using uranium concentrations from one temporary well point (TWP833) and an existing manhole (MH06) on a sanitary pipeline. The plume was drawn assuming that it was following a 10-inch potable water line which was left in place. For plume delineation, water in the manhole was assumed to be in direct contact with groundwater.

In researching this plume it was found that the concentration of dissolved total uranium at the temporary well point (TWP833) in the center of this plume had been misreported by the laboratory. The actual concentration was an order of magnitude lower than what was reported in the RI. Also, the configuration of the plume is conservative because it was drawn assuming that pipeline water was in direct contact with groundwater. If we correct the misreported uranium value at the temporary well point, remove manhole data since it was not representative of groundwater, only include data measured in groundwater and include more recent Environmental Surveillance Program data, the configuration of the plume is different.

Additional subsurface cross-sections completed in the Building 409 area will be used to re-evaluate the plume configuration based on the presence of sand lenses, including the findings for the Upper Water Bearing Zone at well OW18B. This re-assessment will include a review of recent data collected as part of the Environmental Surveillance Program, a review of surface water data and an evaluation as to the possibility of a surface water/groundwater connection.



RI Addendum Topics: NFSS Background Values

- Compare NFSS background values with values from New York State 6 NYCRR 375 Brownfield Program
- Evaluate the distributions of background data from the Upper and Lower Water-Bearing Zones
- Compare background groundwater concentrations for the NFSS with naturally-occurring concentrations of uranium developed by U.S. Environmental Protection Agency
- Present report “Utilizing Isotopic Uranium Ratios in Groundwater Evaluations at NFSS” (Rhodes et al 2006)

To address RI comments received regarding NFSS background levels, the NFSS background data set for soil will be compared to background soil concentrations included in the New York State Brownfield legislation.

To address comments received regarding background groundwater values, the distributions for background groundwater data will also be evaluated for the Upper and Lower Water-Bearing Zones to determine whether two distinct background data sets for these two zones would be more representative of site conditions.

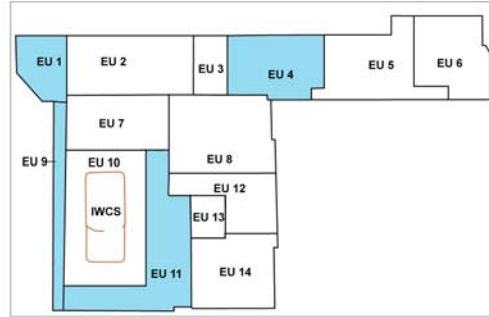
The concentrations of uranium in up-gradient wells used to establish background groundwater concentrations for NFSS will also be compared to naturally-occurring concentrations of uranium in groundwater, as indicated in surveys of drinking water sources cited by the U.S. Environmental Protection Agency (EPA) in promulgating the uranium maximum contaminant level (MCL) for drinking water sources.

Also, to respond to questions regarding the location of uranium isotopes relative to each other and historic information on site operations and storage practices, the report titled *Utilizing Isotopic Uranium Ratios in Groundwater Evaluations at NFSS* (Rhodes et al 2006) will be provided as supplemental RI information. In this paper a site-specific isotopic uranium ratio was developed for the NFSS to better define the nature and extent of uranium contamination in groundwater.



RI Addendum Topics: Groundwater Contamination

- Better define extent of groundwater contamination potentially moving off site at EUs 1, 4, 9 and 11
 - Use boring logs and temporary well points to select optimal locations for permanent well installations
 - Sample wells as part of Environmental Surveillance Program
- Update maps to show revised extent of plumes



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The RI included maps showing the extent of groundwater plumes in the Upper Water-Bearing Zone, but no definable plumes were found in the Lower Water-Bearing Zone. In the Upper Water-Bearing Zone plumes were delineated for uranium, manganese, boron, and organic solvents. Concern has been expressed that some of these plumes may be extending off site including the uranium plume located in the far northeast corner of the site (EU 1), the organic solvent, uranium, manganese and boron plume located near the northern site boundary in EU 4 and the uranium plume located west of the IWCS and its potential interaction with the West Drainage Ditch (EU 9). Additional sampling has been proposed for these three areas.

To better define the off-site extent of groundwater plumes in the Upper Water-Bearing Zone in these three areas, and to determine whether the potential for interaction between groundwater and surface water exists in the West Drainage Ditch, soil boring logs and temporary well points will be utilized to select optimal locations for new permanent well installations at these three areas. These wells, as well as the Central Drainage Ditch, will be sampled as part of the Environmental Surveillance Program.

The new groundwater data will be used to update maps showing the extent of groundwater contaminant plumes.



RI Addendum Topics: Radiological Sample Results

- Present plutonium results for 17 surface soil samples collected during the RI
- Present additional radiological groundwater data from recent Environmental Surveillance Program sampling
- Present radiological results for 57 drum samples of investigative derived waste

The radiological constituents most likely to be present at the NFSS include members of the naturally-occurring uranium, thorium and actinium decay series from processing of uranium ore. Some sampling was done for alternate waste streams including transuranic radionuclides and fission products, including plutonium. After the RI was completed, it was discovered that 17 surface soil samples analyzed for plutonium had been reanalyzed by the lab (based upon their likelihood occurrence) and were inadvertently omitted from the RI data set. These results will be presented in the RI Addendum along with a quality assurance review. In addition, a review of the raw data associated with plutonium determined that several reported values of plutonium were questionable. This review will be included in the RI Addendum along with an uncertainty analysis to indicate whether these results change conclusions regarding the presence of plutonium at the site.

All waste generated during the RI field operations, such as personal protective equipment, sampling devices and soil borings were collected and catalogued. Soil borings from 57 locations were labeled and placed in dedicated drums. Additional radiological analyses for this investigation derived waste will be conducted and reported in the RI Addendum along with additional radiological analyses (cesium, plutonium, strontium, tritium, and technetium) for groundwater from the recent Environmental Surveillance Program sampling.



RI Addendum Topics: Off-site Surface Water and Sediments

- Investigate potential for surface water/groundwater connection in West Drainage Ditch
- Presentation of environmental surveillance program data for West and Central Drainage Ditches
- Presentation of modeling results to assess groundwater/surface water interaction in ditches



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One of the objectives of the additional groundwater sampling discussed on Slide 14 is to investigate whether the potential for interaction between groundwater and surface water exists in the West Drainage Ditch. This analysis will utilize groundwater and surface water/sediment data collected in the West Drainage Ditch as part of the Environmental Surveillance Program.

Environmental Surveillance Program data from the Central Drainage Ditch will be presented in the RI Addendum along with the results of radiological samples collected during the LOOW Underground Utilities RI. If newer information from the Environmental Sampling Program suggests changes to our understanding of the nature and extent of contamination, a discussion of this information will be presented in the RI Addendum.

Finally, modeling results to assess groundwater/surface water interaction in ditches will be presented.



RI Addendum Topics: Historic Operational Areas

- Supplemental review of historic aerial photos by the Topographic Engineering Center to identify historic operational areas
- Overlay historic operational area photos with RI sampling locations
- Compare historic operational area photos with groundwater plumes
- Knolls Atomic Power Labs (KAPL) historical records and waste manifests



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To further assess historical site operations, a more in-depth historical aerial photo review of the site will be conducted by the Topographic Engineering Center (TEC). An interpretation of aerial photographs was included as part of the history search for the former LOOW covering the period between 1938 and 1997. A similar review will be conducted, focused mainly on the 191-acres of the NFSS. The photo review will result in an activity map, which can be used as an overlay of RI sampling locations to identify potential sampling gaps or areas of uncertainty in data coverage.

Historic operational photos will also be compared to the location of current groundwater plumes.

Available historical records and waste manifests for the Knolls Atomic Power Lab materials will also be provided as supplemental RI information.



RI Addendum Topics: Subsurface Geology

- Incorporate Phase 3 soil boring information into the assessment of sand lenses
- Develop additional subsurface cross-sections to better understand extent of sand lenses
- Present revised down-hole gamma logging results



To further our understanding of subsurface geology, boring logs for the Phase 3 RI investigations will be appended to the RI Addendum. Analytical results from Phase 3 of the RI were utilized, however, the geostatistical assessment of sand lenses was completed prior to the availability of the Phase 3 soil boring logs. Additional subsurface cross-sections will be developed near the IWCS and near the areas where groundwater contamination is potentially moving off site to better understand the occurrence of sand lenses. The sand lens analysis and the additional cross-sections will be used to test the conclusions of the RI Report.

The RI Addendum will also present revised down-hole gamma logging results from Appendix K of the RI. The scale for the down-hole gamma logging results will be corrected, but this will not change any of the conclusions made based on this information.



RI Addendum Topics: Supplemental Information

- Present details on Environmental Surveillance Program monitoring of the site
- Screen of railroad ballast and road and building core samples



The RI Addendum will also include a description of the Environmental Surveillance Program and an explanation of how the program monitors IWCS integrity.

Samples of railroad ballast, building materials and road core were collected and analyzed during the RI but the results were not evaluated in the RI or the Baseline Risk Assessment because there was no representative background level for comparison. However, to be thorough, these samples will be screened against surface soil background levels and risk-based limits in the RI Addendum. This screening will include an evaluation of whether the material is MED-related material, or not.



FS Work Plan

- CERCLA approach on three Operable Units
 - IWCS
 - Balance of Plant
 - Groundwater

- Technical Memoranda for key FS technical issues

As we continue to work on the RI Addendum, we also begin to turn our sights toward the Feasibility Study. During the Feasibility Study, cleanup objectives will be developed and multiple remedial alternatives will be considered. As stated earlier, a framework for the NFSS Feasibility Study has been developed that divides the site into three distinct operable units:

- the IWCS
- the Balance of Plant and
- Groundwater.

Which will be explained further in the upcoming slides.

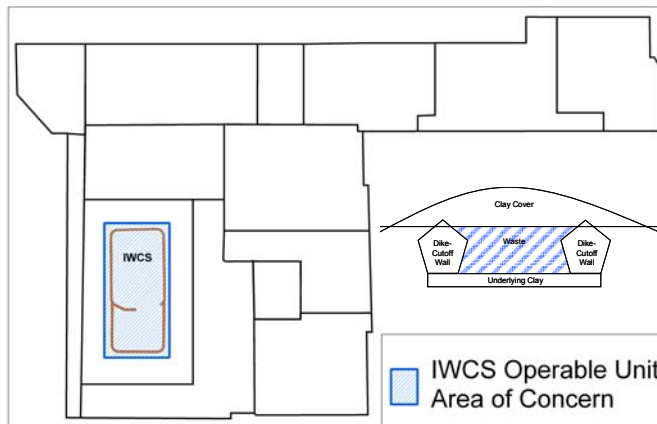
This approach has several advantages including that it allows for prioritization, and faster action on the area of the site that presents the greatest area of potential risk, the IWCS.

Another feature of the Feasibility Study Work Plan is the use of Technical Memoranda to address key technical issues for the Feasibility Study and encourage public engagement during early stages of the Feasibility Study, rather than waiting for Feasibility Study completion.



NFSS Operable Units

- **IWCS Operable Unit** - residues and other waste materials placed inside the IWCS



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Let's start with a definition. An "Operable Unit" is an area of the site, or an environmental media, that will be assessed for the feasibility of using a given remedial approach. For example, excavation and disposal may be suitable for some operable units where pumping and treating may be needed for an operable unit that includes groundwater.

For the NFSS, three Operable Units have been described:

The IWCS Operable Unit includes radioactive residues and other waste materials placed inside the IWCS by the Department of Energy during previous remedial efforts.

Remedial alternatives being considered for the IWCS Operable Unit Feasibility Study will include:

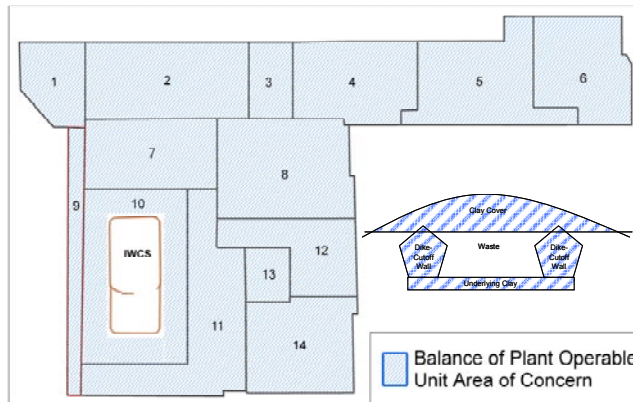
- Complete removal of the IWCS contents with off-site disposal
- Removal of all residues, except the former R-10 pile, with off-site disposal
- Removal of K-65 residues with off-site disposal
- Removal of residues with placement in new on-site, long-term storage facility
- Limited action—enhance the current IWCS site controls, maintenance and monitoring
- No further action with site controls and maintenance and monitoring
- No action which is required by CERCLA and will be used as a basis of comparison to other alternatives. However, the Corps doesn't consider it as a feasible option

No numeric cleanup criteria will be calculated for the IWCS Operable Unit. If materials are selected for removal, they will be visually identified and removed along with an additional buffer of the surrounding materials.



NFSS Operable Units

- **Balance of Plant Operable Unit** – all site soils, surface/subsurface features outside the IWCS and remaining IWCS soils and structures



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The Balance of Plant Operable Unit Feasibility Study will address all site soils, surface/subsurface features outside the IWCS and remaining IWCS soils and structures should all residues and waste be removed. The Balance of Plant materials will be delineated using numeric cleanup criteria developed during the Feasibility Study.

Remedial alternatives being considered for the Balance of Plant Feasibility Study will include:

- Complete removal of all materials contaminated above numeric cleanup, with off-site disposal
- Partial removal of materials contaminated above numeric cleanup, with land use controls and off-site disposal
- Complete removal of materials contaminated above numeric cleanup with on-site disposal
- Partial removal of materials contaminated above numeric cleanup with land use controls and on-site disposal
- No further action with site controls and maintenance
- No action (required by CERCLA)



NFSS Operable Units

- **Groundwater Operable Unit** - remaining groundwater contamination found in the Upper Water Bearing Zone after remedy selection for the IWCS and Balance of Plant Operable Units



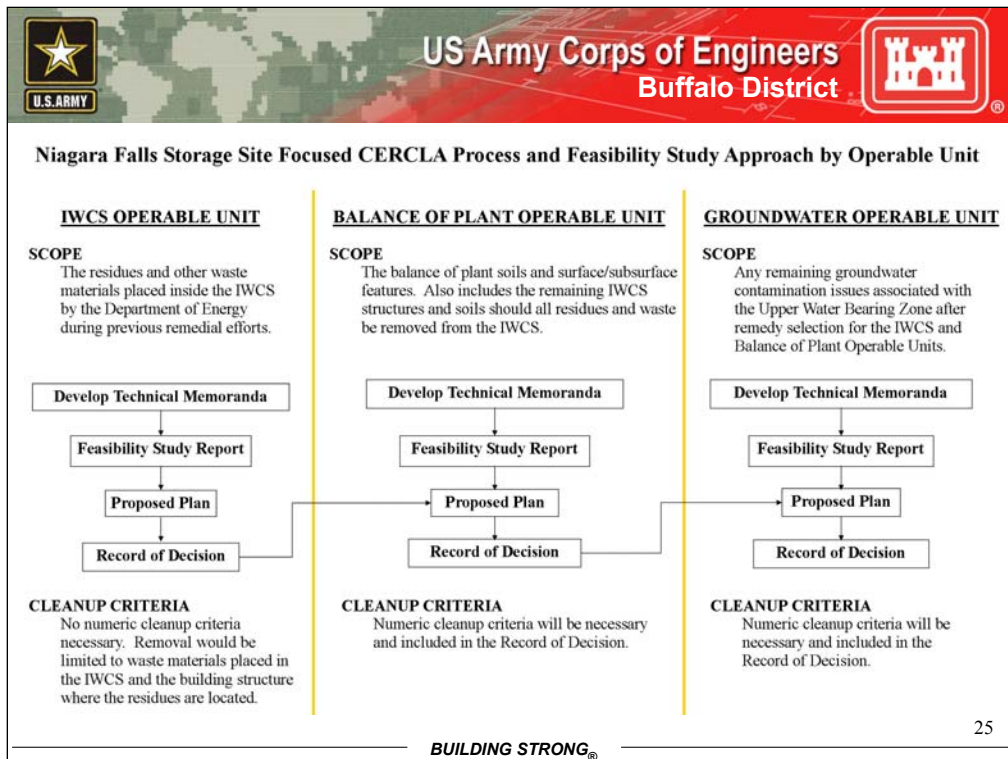
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The Groundwater Operable Unit will address any remaining groundwater contamination after remedy selection for the IWCS and Balance of Plant Operable Units. Note that this figure shows the groundwater plume configuration that was presented in the RI Report. The plume shapes and extents will be updated based on RI Addendum activities and the new extents will be carried forward to the Feasibility Study.

Remedial alternatives being considered for the Groundwater Feasibility Study will include:

- Source removal with groundwater treatment
- Reactive barriers
- Plume containment
- No further action with site controls and maintenance and monitoring
- No action (required by CERCLA)



The CERCLA approach for the NFSS will first focus on the IWCS Operable Unit where the significant inventory of radiologically contaminated materials is located. Should a remedy be selected that results in all of the waste materials inside the IWCS being removed, then the remaining IWCS structure (e.g., cut-off walls, dikes, subsurface soils, etc.) would be addressed within the scope of the Balance of Plant Operable Unit. The sequencing of the three operable units (1) allows for the IWCS to be addressed first, (2) accounts for the fact that the final remedial action selected has an impact on which alternatives may be viable for the Balance of Plant Operable Unit, and (3) accounts for the fact that the final remedial actions selected for the IWCS and Balance of Plant Operable Units has an impact on the alternatives for the Groundwater Operable Unit.

Prior to developing the Feasibility Study Report and associated various alternatives for a given operable unit, technical memoranda specific to that operable unit would be developed to address key technical issues and allow public involvement early in the Feasibility Study phase. The results from the technical memoranda will be used in the development/evaluation of the remedial action alternatives and the Feasibility Study Report.

Once the Feasibility Study is published for a specific operable unit, The Corps will proceed with the development of the proposed plan. However, before the proposed plans for the Balance of Plant and Groundwater Operable Units can be completed, the final remedy selection (i.e., the Record of Decision) must be made for the IWCS and Balance of Plant Operable Units, respectively.

NOTE: For the IWCS Operable Unit, there will not be any need for specific numerical cleanup criteria since any removal actions would involve removing the materials placed into the IWCS and not the underlying soils. Numerical cleanup criteria will be necessary for the other two operable units. Should all of the waste placed in the IWCS be removed, then the remaining structures and underlying soils would be addressed under the Balance of Plant Operable Unit. Should any waste materials placed into the IWCS remain, then the IWCS alternatives would have to demonstrate that the alternatives are protective. For IWCS Operable Unit partial removal alternatives (e.g., removal of certain residues only), then the removal criteria would be visual and limited to the structure where the residues are located.



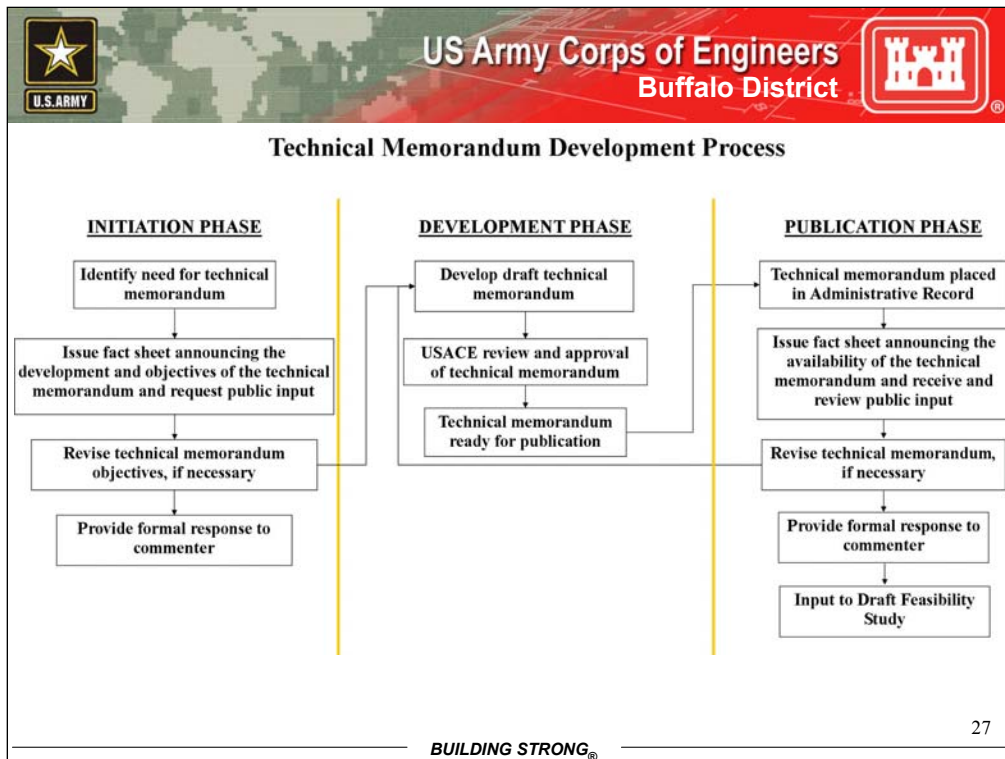
Benefits of Operable Unit and Technical Memorandum Approach for the FS

- Allows for initial focus on the IWCS
- Allows for more appropriate selection of remedial alternatives for each Operable Unit
- Encourages public input in the early phases of FS development
- Allows for initiation of FS-related activities prior to completion of the RI Addendum

One of the key benefits of using the Operable Unit approach is that it allows for prioritization and faster action on the area of the site that presents the greatest potential risk, the IWCS.

Breaking the site up into Operable Units also allows for more appropriate selection of remedial alternatives for each Operable Unit.

Using the Technical Memorandum Process allows for public engagement during early stages of the Feasibility Study, rather than waiting for Feasibility Study completion. It also allows the Feasibility Study effort to begin while RI activities continue so progress on the Feasibility Study is not dependent on RI findings.



Technical memoranda are Operable Unit-specific documents issued to address specific technical areas associated with each of the three Operable Units. They address key technical issues that have impacts on the selection and evaluation of remedial alternatives. The technical memorandum process will provide a means for achieving consensus on fundamental issues necessary for the development and evaluation of remedial alternatives for the three Operable Units. By completing the technical memoranda in a step-by-step process that establishes key elements and fundamental concepts for remedial action alternative analysis, a specific path forward will be defined for completion of the Feasibility Study.

The technical memorandum process begins with the release of a fact sheet that announces the intent to issue a technical memorandum, describes the purpose and objectives of the technical memorandum and asks for public input. If necessary, the technical memorandum objectives will be modified in response to public comments.

During the development phase, the technical memorandum is written and revised and prepared for release to the public. Once the technical memorandum is ready for publication, a draft copy of the document will be placed in the NFSS Administrative Record. A second fact sheet will be issued to summarize key findings of the technical memorandum and announce its availability. Public comment will again be accepted. Substantial comments could require revision of the technical memorandum and another round of comments. The technical memorandum process provides for public review and comment at both the beginning (the Initiation Phase) and the end (the Publication Phase).



IWCS Technical Memoranda

- Radon Assessment
- Radiological Exposure Assessment
- Waste Disposal Options and Fernald Lessons Learned
- Remedial Action Objectives and potential Applicable or Relevant and Appropriate Requirements for both the IWCS and Balance of Plant Operable Units
- Alternatives Development and Screening of Technologies

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The following slides present the preliminary scope and objectives of planned technical memoranda for each of the three Operable Units, beginning with the IWCS Operable Unit. In some cases, a technical memorandum developed for the IWCS Operable Unit will also apply for the Balance of Plant Operable Unit.

Technical memoranda for the IWCS Operable Unit include:

- Radon Assessment - This technical memorandum will present an estimation of radon levels emanating from the residues currently stored in the IWCS under various release scenarios. Predicted radon levels will be compared to federal radon standards and guidelines to assess potential health impacts from radon exposures.
- Radiological Exposure Assessment – This technical memorandum will assess potential gamma radiation exposures associated with various IWCS release scenarios. Potential receptors will include both remediation workers and members of the general public, including off-site and on-site receptors.
- Waste Disposal Options and Fernald Lessons Learned – This technical memorandum will address the following two topics: (1) the latest waste disposal options available for the various NFSS waste streams and (2) lessons learned from the activities associated with the removal, material handling, packaging and shipment of the K-65 residues at the Fernald site.
- Remedial Action Objectives and potential Applicable or Relevant and Appropriate Requirements - Remedial Action Objectives specify the requirements that remedial alternatives must fulfill in order to protect human health and the environment and provide the basis for identifying and evaluating remedial alternatives. The Remedial Action Objectives for the NFSS will be based on applicable or relevant and appropriate requirements when possible, and will provide for long-term protection of human health and the environment. This technical memorandum will apply to both the IWCS and Balance of Plant Operable Units.
- Alternatives Development and Screening of Technologies – This technical memorandum will identify and detail various remedial alternatives for the IWCS Operable Unit. It is anticipated that through development of this technical memorandum, a list of remedial alternatives to carry forward for detailed analysis in the Feasibility Study Report will be finalized. We will look at everything from complete removal with off-site disposal to the “no action alternative” which is required by CERCLA.



Balance of Plant Technical Memoranda

- Land Use Assessment and Groundwater Evaluation
- Establishment of Radiological and Chemical Cleanup Standards and Evaluation of Residual Results
- Alternative Development and Screening of Technologies
- Volume Modeling and Results

Elements to be covered by the Balance of Plant Operable Unit Technical Memoranda include:

▪ **Land Use Assessment and Groundwater Evaluation** – This technical memorandum will evaluate plausible future land uses for the NFSS property and the possible uses, if any, of groundwater at the site. To adequately evaluate future land use and to clearly develop cleanup standards for the site, consensus needs to be reached on whether the groundwater associated with the Upper Water-Bearing Zone should be treated as a viable source of drinking water.

▪ **Establishment of Radiological and Chemical Cleanup Standards and Evaluation of Residual Results** - This technical memorandum will establish radiological and chemical cleanup standards and evaluate the residual results. The technical memorandum will summarize regulatory requirements, present modeling assumptions, describe target receptors, and document concentration-based standards for the radiological contaminants.

▪ **Alternative Development and Screening of Technologies** - This technical memorandum will identify and detail various remedial alternatives for the Balance of Plant Operable Unit. It is anticipated that through development of this technical memorandum, a list of alternatives to carry forward for detailed analysis in the Feasibility Study will be finalized. We will look at remedial alternatives from complete removal with off-site disposal to the “no action alternative” which is required by CERCLA.

▪ **Volume Modeling and Results** – This technical memorandum will document the calculations made to estimate the volume of materials to be removed. This will include features of the conceptual site model that are relevant to volume calculations, methods used to develop volume estimates, data inputs and uncertainties.



Groundwater Technical Memoranda

- Remedial Action Objectives and Applicable or Relevant and Appropriate Requirements
- Establishment of Radiological and Chemical Cleanup Standards and Evaluation of Residual Results
- Alternatives Development and Screening of Technologies
- Groundwater Flow and Contaminant Transport Modeling Update (Optional)

Technical memoranda to be developed for the Groundwater Operable Unit include:

- Remedial Action Objectives and Applicable or Relevant and Appropriate Requirements – This technical memorandum will be similar to the Remedial Action Objective and Applicable or Relevant and Appropriate Requirements technical memorandum developed for the IWCS and Balance of Plant Operable Units. The technical memorandum will identify Remedial Action Objectives that specify the requirements that remedial alternatives must fulfill in order to protect human health and the environment and provide the basis for identifying and evaluating remedial alternatives. The Remedial Action Objectives for the NFSS will be based on Applicable or Relevant and Appropriate Requirements when possible, and will provide for long-term protection of human health and the environment.
- Establishment of Radiological and Chemical Cleanup Standards and Evaluation of Residual Results - This technical memorandum will establish radiological and chemical cleanup standards for groundwater and evaluate the residual results.
- Alternatives Development and Screening of Technologies – Just as for the other operable units, this technical memorandum will identify and detail various remedial alternatives for the Operable Unit. It is anticipated that through development of this technical memorandum, a list of remedial alternatives to carry forward for detailed analysis in the Feasibility Study will be finalized. We will look at everything from complete removal with off-site disposal to the “no action alternative” which is required by CERCLA.
- Groundwater Flow and Contaminant Transport Modeling Update - The need for this technical memorandum is dependent on which remedial actions are selected for the IWCS and Balance of Plant Operable Units. Should groundwater concerns continue to be an issue after selecting remedies for the IWCS and Balance of Plant Operable Units, USACE will decide on the necessity and scope of this technical memorandum.



What's Next?

- Provide public with written responses to all comments on the RI by the fall of 2009
- Conduct additional RI field activities and complete the RI Addendum
- Review public comments on the FS Work Plan and revise work plan, if necessary
- Begin implementation of the FS Work Plan
- Begin preparation of IWCS Technical Memoranda
- The Corps will continue with site maintenance, environmental monitoring, and annual reporting

Planned activities for the NFSS include:

- Provide public with written responses to all comments on the RI by the fall of 2009
- Conduct planned additional RI field activities (targeting the Fall 2009) and complete RI Addendum
- Review public comments on the Feasibility Study Work Plan and revise work plan, if necessary
- Begin implementation of the Feasibility Study Work Plan
- Begin preparation of IWCS Technical Memoranda
- The Corps will continue with site maintenance, environmental monitoring, and annual reporting



Access to Information

Copies of the RI, the Baseline Risk Assessment and the
Groundwater Modeling Report are available in the
Lewiston and Youngstown Libraries

Text of existing documents are available upon request
or they may be downloaded at:

<http://www.lrb.usace.army.mil/fusrap/nfss/index.htm>

RI Report

Baseline Risk Assessment

Groundwater Flow and Contaminant Transport Modeling Report

These reports may also be downloaded at:

<http://www.lrb.usace.army.mil/fusrap/nfss/index.htm>



Contact Us

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Poster Session

Station 1: RI Posters

- Location of Site-wide Pipelines and Utilities
- Interim Waste Containment Structure
- Soil Sampling Locations and Findings Based on Possible Future Land Use
- Groundwater Sampling Locations and Findings Based on Possible Future Land Use
- Sediment and Surface Water Sampling Locations and Findings Based on Possible Future Land Use
- Total Uranium Plumes Above Background in the Upper Water Bearing Zone
- Response to Public Comments on the RI

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Refer to Station 1



Poster Session

Station 2: FS Posters

- CERCLA Process
- CERCLA Process & FS Approach by Operable Unit
- FS Operable Units
- Technical Memorandum Process

Refer to Station 2



Poster Session

Station 3: LOOW Poster

➤ Military Munitions Archive Search

The Corps and its contractors available for discussion while you view the posters. A round table discussion will begin in 30 minutes.

Refer to Station 3



We've allotted 30 minutes for the poster session, after which we will have the round table discussion. Here is a map showing the location of the NFSS site and the surrounding area for reference as your review the posters.



- Presentation (6:00 - 6:45 pm)
 - Status of the NFSS in the CERCLA process
 - Completed and planned Remedial I activities
 - Transition into FS phase of CERCLA
- Poster session (6:45 – 7:15 pm)
- Round table discussion (7:15 – 8:45 pm)